RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole 51-00-07

Log Event A

Borehole Information

Farm : TX	**Tank :** TX	**Site Number :** 299-W15-73
N-Coord : 41,590	**W-Coord :** 76,103	**TOC Elevation :** 669.24
Water Level, ft :	**Date Drilled :** 3/7/1949	

Casing Record

Type : Steel-welded	Thickness, in. : 0.313	ID, in. : 8
Top Depth, ft. : 0	Bottom Depth, ft. : 150	

Borehole Notes:

This borehole was originally completed on March 7, 1949 in a dual casing configuration with 12-in. casing from the surface to 50 ft and 10-in. casing from the surface to 150 ft. The driller's log indicates that the 10-in. casing was perforated with five holes per foot from 40 to 100 ft. However, when the borehole was logged with the SGLS in February 1996, the inside diameter of the casing was 8 in. It was demonstrated that this borehole has a single 8-in. casing by comparing the calculated concentrations of K-40, using an 8-in. casing correction factor, to the calculated concentrations of K-40 from a nearby borehole, 51-04-08, which has a 6-in. casing. Both log plots have a mean value 20 pCi/g for the K-40 concentrations below 45 ft and a mean value of about 12 pCi/g above 40 ft. If this borehole had multiple casings that were not corrected for, the calculated concentrations would not correlate with the calculated values for borehole 51-04-08. The present top of the borehole casing is even with the ground surface. The SGLS was able to reach a depth of 149 ft. The casing thickness is presumed to be 0.322 in., on the basis of published thickness for schedule-40, 8-in. steel casing.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 10/1995	**Calibration Reference :** GJPO-HAN-3	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number :	1	**Log Run Date :**	2/16/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	23.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	2/20/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	149.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	84.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Borehole 51-00-07

Log Event A

Log Run Number :	3	**Log Run Date :**	2/26/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	85.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	22.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Analysis Information

Analyst : E.P. Baumgartner

Data Processing Reference : P-GJPO-1787 Analysis Date : 8/14/1996

Analysis Notes :

The logging of this borehole was completed in three runs using the SGLS. The field verification spectra recorded immediately before and after the survey operation met the acceptance criteria established for the peak shape and system efficiency, confirming the SGLS system was operating within specifications. The energy calibration and peak-shape calibration from these verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing-correction factors for a 0.322-in.-thick steel casing were not available during analysis. A correction factor of 0.330 was applied, which will cause the calculated concentration to be slightly less than the actual concentration.

Depth overlaps, where data were collected by separate logging runs at the same depth, occurred in this borehole between 22 and 23 ft and between 84 and 85 ft. No man-made radionuclides occur within these intervals; however, the concentrations of the natural radionuclides (K-40, U-238, Th-232) were calculated using the separate data sets. The measured concentration of K-40 and Th-232 were within the statistical uncertainty of the measurements, indicating very good repeatability of the radionuclide concentration measurements. The difference in the measured U-238 concentration at some of the overlapping points exceeded the statistical uncertainty of the measurements. However, this measurement is affected by radon gas flowing into and out of the borehole. The amount of radon in the borehole environment is not stable during multiple logging runs.

Cs-137 and processed U-235 and U-238 were detected in this borehole. Cs-137 was detected at the surface and discontinuously from 45.5 to 134 ft with the highest concentration values slightly less than 2 pCi/g. Processed U-235 was detected randomly from 69 to 77.5 ft with concentration values less than 5 pCi/g. Processed U-238 was also detected discontinuously from 69 to 78 ft with a maximum concentration value of about 42 pCi/g.

The K-40 log has a steep increase beginning at 41 ft and continuing to 46 ft. The concentration values rise from a mean of 12 pCi/g to a mean of 20 pCi/g.

Details regarding the interpretation of the data for this borehole are presented in the Tank Summary Data Report for tank TX-104.

Log Plot Notes:

Separate log plots show the man-made (e.g., Cs-137) and the naturally occurring radionuclides (K-40, U-238, and Th-232). The natural radionuclides can be used for lithologic interpretations. The headings of these plots

Borehole 51-00-07

Log Event A

identify the energy peak for the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainty for the calculated concentrations at the 95-percent confidence level. The MDL is shown by open circles on the plots. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made radionuclides, the naturally occurring radionuclides, the total gamma count derived from the SGLS and the Tank Farm gross gamma log. The gross gamma plot displays the latest available digital data favailable in the database. No attempt has been made to adjust the depths to coincide with the SGLS data.